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AFOTEC:
Creating Active Involvement and Institutionalizing Early Influence

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The Air Force Operational Test and Evaluation Center (AFOTEC) faces many challenges in an ever evolving acquisition environment. However, these challenges present fresh opportunities for the Air Force's Operational Test Agency to refine its operations and responsiveness in order to enhance our ability to ensure warfighters are delivered the capabilities they need, when they need them, to allow our Airmen, as well as our joint and coalition partners to fight more effectively and with less risk.

As a nation that has been in continuous combat for more than 16 years, longer than World War II, Korea, and Vietnam combined, our Airmen and joint and coalition partners are engaged in the global war on terror and our Air Force is actively searching for ways to rapidly enhance our effectiveness at all levels. The warfighter is demanding the entire acquisition community rapidly develop, test, and field increasingly complex and urgently needed weapon systems despite a reduced force.

Therefore, AFOTEC is focusing our efforts on institutionalizing Early Influence in the air, space, and cyberspace domains; establishing credible AFOTEC liaison officers at the Air Force Materiel Command and Air Force Space Command Product Centers; and aggressively creating the conditions for combined development and operational testing. These initiatives are all aimed at improving our ability to ensure that required warfighting capabilities are delivered within cost and schedule constraints whenever possible. The acquisition community has talked about the *Early Influence* concept for over two decades using many definitions. AFOTEC's goal is to clearly define Early Influence, establish more robust Early Influence activities as soon as possible, and institutionalize Early Influence across all appropriate instructions and regulations.

Early Influence is not a new concept. However, the practical application has proved to be challenging and inconsistent due to the lack of definition. AFOTEC has engaged in programs across the air, space, and cyberspace domains in an inconsistent manner throughout its history. Even the operational testing community does not share a definition of Early Influence. Therefore, we begin this article by defining what we mean by Early Influence.

Defining early influence

Early Influence is AFOTEC's formalized approach to refine capability requirements and acquisition strategies, and then develop early integrated test and evaluation (T&E) strategies and plans. We don't define requirements, but we can help refine them. If we get involved early, even before Milestone A, we can ensure requirements are testable, measurable, and operationally relevant.

Early influence provides AFOTEC the greatest opportunity to affect emerging capabilities and is based upon the premise that issues discovered early, before we have a formal program, are more easily resolved and often less costly. It costs far less to identify and fix problems while acquisition strategies are still in the planning stage and designs are still in development. The warfighting, acquisition, and T&E communities working together early and throughout a program can enable this Early Influence approach.

We begin applying Early Influence standardized methodologies prior to Milestone A by engaging in the capabilities based assessment process. The best opportunity to influence warfighting capabilities is when solutions are still being analyzed. Through formal reviews of the early Joint Capabilities Integration and Development System (JCIDS), documents such as the Joint Capabilities Document (JCD) and Initial Capabilities Document (ICD) we have opportunity to influence capabilities before a material solution, or mix of solutions, is selected. By joining the operational

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T&E (OT&E) professionals with the other players early and often in the acquisition program, we increase communication and coordination enabling increased teamwork, leading to fewer surprises in the later part of the acquisition process.

We recognize there are three areas that can interject change after the inception of a program and before the fielding of the program. These inevitable changes are

(1) Technology continues to advance;
(2) User growth through real world experience;
(3) The nature of combat due to changing threats.

These three factors initiating change in the course of a program must be accounted for in a transparent way if we are to avoid surprises at the end game. They can have an effect on the capabilities of systems and their testing — early and constant communications will ensure that documents and plans can be modified as necessary to keep pace with the changing world. The world does not stop evolving once we publish our requirements or a test plan, and we must remain flexible enough to react.

By institutionalizing the Early Influence approach, we are helping to stress and refine requirements from a testability and measurability standpoint, as well as from an effectiveness and suitability standpoint. I want to emphasize that although AFOTEC does not define requirements for emerging capabilities we can assist in refining requirements. We will work with all stakeholders to ensure requirements are operationally relevant and realistic, and can be tested. Program success is reached when the required capability is delivered into the warfighters' hands, as close to on schedule and budget as possible. Executing Early Influence may seem simple on the surface, however, in order to execute effectively we are revamping our organization and processes to move beyond an era of much discussion and little action.

Managing early influence

AFOTEC has a mature policy that defines Early Influence as a "major operational test and evaluation phase." Early Influence is the first phase of a multi-phased approach of our involvement that then leads to planning, execution, and finally reporting. However, much of the early interaction with the community was being conducted only by our headquarters personnel and was not very robust.

Additionally, we have developed end-to-end Early Influence processes to ensure consistency and repeatability and we will continue to evolve these processes based on lessons learned. AFOTEC's Early Test Operations Division has traditionally led our Early Influence activities and their primary responsibility included starting the initial test planning processes. We are now refining our initial test planning efforts to get as much operational testing data as possible during the developmental testing phase wherever possible. And, we are shifting much of the Early Influence responsibility from the headquarters to our detachments where our hands-on testers live, to involve current and future test directors. The headquarters will then support our detachments in this role.

We've also tailored our training to address Early Influence activities, and we now provide formal training for Early Influence with an emphasis on operational suitability. While considering the entire system lifecycle, our primary targets include operational capability requirements, early integrated test planning, and acquisition strategies to support delivery of the capabilities required by the warfighter.

We are also developing metrics to track our early influence efforts. Again, we are moving away from a primarily bureaucratic process to effect early and active involvement. We have in place the essential elements to influence programs. Now we'll take a look at one of the first steps, initiating involvement in an acquisition program.

Involvement determination

A number of considerations go into making an acquisition involvement determination ranging from statutory mandates to multi-service participation. Operational risk is always a consideration. New capabilities that result in "game changing" operations such as new or significantly enhanced mission areas warrant the fidelity and rigor of the testing AFOTEC brings to the program. However, enhancements to existing capabilities to be used under current concepts of employment and support may be more suited for Major Command testing.

AFOTEC has a robust involvement determination process and in the past we've normally identified programs in one of two ways: we would either be asked to become involved or we would identify programs ourselves for involvement. Our involvement threshold has changed and starting now we are not waiting to be asked. If we're being asked, we're late. Self-identification is where AFOTEC is placing additional emphasis and we have several initiatives underway to strategically position AFOTEC liaisons as active conduits between AFOTEC, the Major Commands, and the Product Centers. We want to discover emerging programs as early as possible, make rapid involvement determinations, and then get involved early and often to assist in promoting program success.

Capability requirements

A major element of effective Early Influence focuses on capability requirements development. The external

expectation is for testers to focus on the testability of requirements supporting early milestones or other key decision points. Although they are based on valid warfighter needs, the parameters are often not defined very well and this is where AFOTEC can add value to the process. Testability is not our only focus, as we also look for completeness of requirements such as how well the key system attributes and associated thresholds address the capability gap. The refinement, rigor and fidelity we add to requirements leads to a better product delivered to the warfighter on time and on cost. In addition, while refining the requirements, we are simultaneously looking for ways to save time and money by creating opportunities to gather operational test data during the developmental test phase of testing.

AFOTEC is a core member of the Air Staff's High Performance Team and takes part in the development of initial capabilities documents and capability development documents. The document review process ensures focus on lifecycle management issues such as reliability and maintainability, logistics supportability, and training. While AFOTEC is not a signatory on these documents, we provide face-to-face and written comments and suggestions. These early document reviews help the users refine their capability requirements and lay the foundation for initial test design. AFOTEC is a voting member of the Air Force Requirements Oversight Council where final approval of these documents is achieved.

We are aggressive in our Early Influence role reviewing all of the JCIDS documents. We recently made critical comments on the Joint Heavy Lift ICD. We addressed the lack of logistic focus, and specifically recommended mission and sortie generation, material reliability, training, and other related integrated logistics elements be addressed in the ICD. These areas are significant enabling attributes and capabilities for the eventual Joint Heavy Lift solution, and should be taken into consideration early.

Initial test design

Initial test design is another focus of Early Influence. It is a systematic approach to take the test teams from capability requirements to credible OT&E constructs which, when executed, will yield the final data required by decision-makers to make program decisions.

There is no panacea to how and when testing is done, but there are opportunities where more test data can be pulled from training and actual combat sorties. The CV-22 is going through current testing with operators and the test community working together. When we have reached the level of T&E that the warfighter needs, we can issue reports that are relevant to pressing needs such as looming deployments. We are flexible enough to schedule the rest of the required testing when the test assets are once again available. So in this case, we can complete the required testing and also support the warfighting customer to fulfill his mission requirements at the same time.

We strive to use Integrated Test Teams (ITTs) to develop test designs, and we execute rigorous design efforts for Test and Evaluation Strategies for Milestone A, and Test and Evaluation Master Plans for Milestone B. In the past, inputs were often based on the experience of a few subject matter experts without using standard processes and that led to OT&E inputs with a significant number of unknowns in early documents.

Initial AFOTEC test designs are based on envisioned concepts of operations and support, designed around the operation the user intends to employ the system. We've created early test designs based on a wide range of operations from combat operations to noncombat information technology systems used for finance, and personnel management. AFOTEC designs test around the operation, but scopes the operational testing to the system.

As we design the test around the operations, high-fidelity system characteristics are not critical at this point. Designing around the operation enables very early test designs and material solutions can evolve from initial expectations. The result of early planning rigor is fewer unknowns, higher fidelity test resource projections, and early identification of test capability shortfalls that will have to be overcome. For example, initial test design was completed on the KC-X and CSAR-X programs before either program had completed the down-select process to a specific platform. We have also proven that the process can be executed on very short timelines. We recently tested the Laser Joint Direct Attack Munition with Air Combat Command on a timeline based on months, not years, as a good example of our rapid test capability and flexibility.

AFOTEC does not accomplish these initial test designs in a vacuum. Much like the Air Staff's High Performance Teams, AFOTEC uses a core team composed of both internal and external participants.

Core team approach

The core team approach invites those with a vested interest to take part in the initial test design process and is consistent with the integrated test team approach. The core team might include lead major commands, other service operational test agencies, as well as other members from the operations, acquisition, and test and evaluation communities. In some cases it

will be the first time all of the integrated test team members come together. Because AFOTEC executes initial designs before material solutions are selected, responsible test organizations or developmental testers may not have been selected yet. In these cases, AFOTEC will now invite the center test authorities to these meetings. Even though operational testing is the final acquisition phase prior to the system's fielding and deployment, involving operational testers early in the entire process can lower risk and increase the chances of successfully conducting the operational test phase of a program.

It is essential for the success of any program that all participants, that include the major command sponsor, product center, program manager, contractor, developmental testers, and operational testers, collaborate early in the program, well before test articles are produced, to ensure the success of the program. Each participant brings relevant information to the table and takes away a better understanding of the projected operational test and evaluation phase. The user communities bring current operational expertise and requirements clarity, while the program offices bring specific acquisition information and clarify questions about acquisition decisions, schedules, and actual capability increments. When developmental testers participate, there is a better chance of seeing operational testing data points in developmental test plans. Developers can provide details on the system under development as well as provide their interpretation of operational requirements.

Initial test design

Early involvement in developing OT&E designs inherently results in timely planning. AFOTEC initial test designs are driven by the need for confidence in our results. By applying rigorous, repeatable processes and gaining community buy-in during initial test designs, decision risk is addressed and credibility is achieved. Instead of looking at the lack of requirements and employment or support concepts as rationale to not become engaged in programs, I've charged my staff to leverage our early influence mindset and use the information gained during our utility assessments to refine the capability requirements, evolve the employment concept of operations, and help develop the support and training concepts. Essentially, our testers will be part of the solution when it comes to supporting rapid transition from technology demonstrations to programs.

Defining the operation and selecting operational test events based on operational factors allows us to design operationally relevant test scenarios. Initial AFOTEC test designs are based on envisioned concepts of operations and support and designed around the operation the user intends to employ the system. These scenarios are initially developed as end-to-end operational activities and the first choice is always live field testing. When field testing is not practical, we consider other methods like modeling and simulation. The result of early planning is fewer unknowns, higher fidelity test resource projections, and early identification of test capability shortfalls. Operational sufficiency and technical adequacy are achieved by addressing these areas early.

If there will be a multiservice OT&E effort, representatives from our sister-service operational test agencies attend to ensure service-specific interests are addressed during early test designs. We currently have about 45 multiservice OT&E efforts in progress.

Bringing the right people together at the right time is essential toward meeting initial test design expectations. This approach also works in the space program acquisition process. We have several initiatives underway to make OT&E more relevant in the unique acquisition process for space programs. Specifically, we are looking to identify acceptable methods to execute more OT&E in less than completely operational environments — that is, prior to launch. This requires getting involved early, increasing influence on the development testing design to increase the likelihood of acquiring useful OT&E data and a reassessment of risk tolerance. AFOTEC will become much more involved in the development work and testing that goes on in government and corporate labs today to accomplish this revised testing strategy. We are looking at where and how we can have a greater influence on developing operationally sufficient test capabilities in the Space realm. These capabilities should be useful for both development and operational testing efforts. Typically, we have only become involved once systems were on orbit, so it was more or less a stan-eval effort as our reports were not informing acquisition decisions.

Finally, we are establishing a liaison officer position in place at the Space and Missile Systems Center (SMC) at Los Angeles AFB, California, to work the full range of programs as they emerge. Both AFOTEC and the SMC will gain from this, but ultimately, our warfighters will get the greatest benefit. AFOTEC is changing the way we do operational test in space and is working toward partnership and teamwork.

Strategic initiatives

While AFOTEC is actively engaged in Early Influence initiatives at the tactical level, we are also working these initiatives at a strategic level. AFOTEC is heavily involved in the Air Force Smart Operations 21st Century initiative, commonly referred to as AFSO21. As an organization, we are looking at our

processes from beginning to end. This includes our involvement with the Developing and Sustaining Warfighting Systems process. The author is a cochair with the Air Force Materiel Command on the Test and Evaluation subprocess team. They are collaborating on initiatives approved by the AFMC Commander and the Chief of Staff of the Air Force, to increase confidence in early acquisition efforts by institutionalizing Early Influence across the developmental and operational test communities. AFOTEC already had rudimentary Early Influence policy and processes in place and was organized to specifically address early acquisition efforts. The early preparation allowed them to play an integral role in the Milestone B initiative designed to foster more combined developmental and operational test plans. Importantly, this work has given the AFOTEC the opportunity to hone its processes.

While the Air Force instructions did a reasonable job of addressing most issues associated with acquiring and testing new systems, we worked to strengthen them across the entire test and acquisition community to institutionalize early influence activities supporting Milestone B. AFOTEC recently participated in the annual Test and Evaluation Policy Conference in Washington, D.C., and as a result Early Influence is now more clearly codified and institutionalized in Air Force and AFMC instructions (AFI 99–103, Capabilities Based Test and Evaluation; AFI 63–101, Operations of Capabilities Based Acquisition System; AFMC 99–103, Test Management).

AFOTEC is now an advocate of institutionalizing actionable Early Influence, not just continuing to talk about it. AFOTEC can influence all areas early and consistently throughout the life of a program, to include addressing known life cycle management costs and accounting for changes as a program matures. Through early and continuous communication and coordination, AFOTEC will benefit from high confidence planning and potential schedule and cost savings. AFOTEC's goal is increased teamwork leading to fewer surprises at end of the process.

We are working closely with my detachment commanders to increase their role in developing early partnerships with the warfighting and acquisition communities. We will capitalize on their expertise to further enhance our ability to positively affect programs and early. The need for Early Influence is even greater now because of the long war we are engaged in. Increased communication and coordination leading to greater team work and fewer surprises is what AFOTEC is striving to achieve, and we are increasing our efforts to work more closely with the acquisition and warfighting communities. AFOTEC's vector is clear. We intend to have a positive influence through early activities, and to that end we will get involved early with clear priorities. Our personnel will make timely involvement determinations and apply appropriate rigor to requirements development and test design. Our test designs will seek opportunities for combined DT and OT testing whenever possible.

Creating active involvement and institutionalizing Early Influence provides better and more capable systems to the acquisition decision makers and the warfighters sooner. The need for Early Influence is even greater now because of the long war we are engaged in. The bottom line is — these efforts will help the acquisition community to provide better, more capable systems to the warfighter … sooner … to accomplish their mission more effectively, with less risk to our Airmen and joint and coalition partners! ❑

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